



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,377	03/31/2004	Hardayal Singh Gill	HIT1P083/HSJ920040042US1	8269

50535 7590 02/28/2007  
ZILKA-KOTAB, PC  
P.O. BOX 721120  
SAN JOSE, CA 95172-1120

EXAMINER
----------

RENNER, CRAIG A

ART UNIT	PAPER NUMBER
----------	--------------

2627

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/28/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/815,377

Applicant(s)

GILL, HARDAYAL SINGH

Examiner

Craig A. Renner

Art Unit

2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 and 9-19 is/are pending in the application.
- 4a) Of the above claim(s) 2,6,7,12 and 19 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 is/are allowed.
- 6) ☒ Claim(s) 1,3-5,9,10 and 13-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 2, 6, 7, 12 and 19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 26 August 2006.

### *Specification*

2. The disclosure is objected to because of the following informalities:

a. In line 6 of claim 1, "said magnetically pinned layer" should be changed to --said magnetically pinned layer structure-- in order to more clearly refer to that set forth in line 3 of claim 1.

b. In lines 8 and 10 of claim 1, each instance of "said pinned layer" should be changed to --said pinned layer structure-- in order to more clearly refer to that set forth in line 3 of claim 1.

c. In line 3 of claim 11, "a magnetically pinned" should be changed to --a magnetically pinned layer-- in order to provide a better antecedent to that referred to in lines 3-4 of claim 11, for instance.

d. In line 10 of claim 11, "one inner ferromagnetic layers" should be changed to --one inner ferromagnetic layer-- for better clarity.

e. In line 3 of claim 17, "a magnetically pinned" should be changed to --a magnetically pinned layer-- in order to provide a better antecedent to that referred to in lines 3-4 of claim 17, for instance.

f. In line 3 of claim 18, "a magnetically pinned" should be changed to --a magnetically pinned layer-- in order to provide a better antecedent to that referred to in lines 3-4 of claim 18, for instance.

g. In lines 9-10 of claim 18, "said pinned layers" should be changed to --said pinned layer-- in order to be consistent with the remainder of the claim.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3-5, 9-10 and 13-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. In lines 1-2 in each of claims 9 and 10, "said three ferromagnetic layers" are indefinite because they lack clear and/or positive antecedent basis.

b. In line 9 in each of claims 17 and 18, "said three ferromagnetic layers" are indefinite because they lack clear and/or positive antecedent basis.

Art Unit: 2627

c. Claims 3-5 and 13-16 inherit the indefiniteness associated with independent claim 17 and stand rejected as well.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 3-4, 9 and 13-18 are rejected under 35 U.S.C. 102(a) and/or 35 U.S.C. 102(e) as being anticipated by Inomata et al. (US 6,611,405).

With respect to claims 3-4, 9 and 13-17, Inomata et al. (US 6,611,405) teaches a magnetoresistive sensor (40) comprising first and second magnetically free layers (41 and 49, respectively); a magnetically pinned layer (43/44/45/46/47) sandwiched between the first and second free layers (as shown in FIG. 4, for instance), the magnetically pinned layer being self pinned (as shown in FIG. 4, for instance); a first electrically insulating barrier layer (42) sandwiched between the first magnetically free layer and the pinned layer (as shown in FIG. 4, for instance); and a second electrically insulating barrier layer (48) sandwiched between the second free layer and the pinned

Art Unit: 2627

layer (as shown in FIG. 4, for instance); wherein three ferromagnetic layers (43, 45 and 47) of the pinned layer are separated from one another by first and second non-magnetic coupling layers (44 and 46) [as per claim 17]; wherein the pinned layer comprises Co and Fe, wherein the atomic percent of Fe is about 50% (line 61 in column 12 thru line 14 in column 13, for instance, i.e., " $\text{Co}_x\text{Fe}_{1-x}$ " where  $x=0.5$ ) [as per claim 3]; wherein the pinned layer comprises CoFe with an atomic percent of Fe ranging from 20 to 60 percent (line 61 in column 12 thru line 14 in column 13, for instance, i.e., " $\text{Co}_x\text{Fe}_{1-x}$  ... where  $0.5 \leq x < 1.0$ " includes values within the claimed range) [as per claim 4]; wherein the three ferromagnetic layers comprise Co and Fe and wherein the atomic percent of Fe in each layer is 20 to 60 percent (line 61 in column 12 thru line 14 in column 13, for instance, i.e., " $\text{Co}_x\text{Fe}_{1-x}$  ... where  $0.5 \leq x < 1.0$ " includes values within the claimed range) [as per claim 9]; wherein the barrier layers comprise aluminum oxide (lines 1-3 in column 10, for instance, i.e., " $\text{Al}_2\text{O}_3$ " is aluminum oxide) [as per claim 13]; wherein the barrier layers comprise magnesium oxide (lines 1-3 in column 10, for instance, i.e., " $\text{MgO}$ " is magnesium oxide) [as per claim 14]; wherein at least one of the free layers comprises CoFe (lines 52-54 in column 7, for instance) [as per claim 15]; and wherein at least one of the free layers comprises a layer of CoFe and a layer of NiFe, the CoFe layer being disposed closer to the pinned layer than the NiFe layer (lines 52-57 in column 7, for instance) [as per claim 16].

With respect to claim 18, Inomata et al. (US 6,611,405) teaches a magnetoresistive sensor (40) comprising first and second magnetically free layers (41 and 49, respectively); a magnetically pinned layer (43/44/45/46/47) sandwiched

Art Unit: 2627

between the first and second free layers (as shown in FIG. 4, for instance), the magnetically pinned layer being self pinned (as shown in FIG. 4, for instance); a first electrically insulating barrier layer (42) sandwiched between the first magnetically free layer and the pinned layer (as shown in FIG. 4, for instance); and a second electrically insulating barrier layer (48) sandwiched between the second free layer and the pinned layer (as shown in FIG. 4, for instance); wherein three ferromagnetic layers (43, 45 and 47) of the pinned layer are separated from one another by first and second non-magnetic coupling layers (44 and 46) comprising Ru (lines 53-55 in column 9, for instance).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inomata et al. (US 6,611,405) in view of Gill (US 2002/0135952).

With respect to claim 1, Inomata et al. (US 6,611,405) teaches a magnetoresistive sensor (40) comprising first and second magnetically free layers (41 and 49, respectively); a magnetically pinned layer structure (43/44/45/46/47) sandwiched between the first and second free layers (as shown in FIG. 4, for instance),

Art Unit: 2627

the magnetically pinned layer structure being self pinned (as shown in FIG. 4, for instance); a first electrically insulating barrier layer (42) sandwiched between the first magnetically free layer and the pinned layer structure (as shown in FIG. 4, for instance); and a second electrically insulating barrier layer (48) sandwiched between the second free layer and the pinned layer structure (as shown in FIG. 4, for instance). With respect to claim 17, Inomata et al. (US 6,611,405) teaches the magnetoresistive sensor as detailed in paragraph 6, supra. Inomata et al. (US 6,611,405), however, remains silent as to the pinned layer material comprising "CoFeV with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent."

Gill (US 2002/0135952), for instance, teaches that CoFeV with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent (paragraph [0015] on page 3, for instance, i.e., "Co<sub>49</sub>Fe<sub>49</sub>V<sub>2</sub>", for instance) is a notoriously old and well known pinned layer material in that art. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have had the pinned layer material of Inomata et al. (US 6,611,405) comprise CoFeV with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent, as taught by Gill (US 2002/0135952), for instance. The rationale is as follows:

One of ordinary skill in the art would have been motivated to have had the pinned layer material of Inomata et al. (US 6,611,405) comprise CoFeV with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent, as taught by Gill (US 2002/0135952), for instance, since such is a notoriously



old and well known pinned layer material in that art as shown by Gill (US 2002/0135952), for instance, and since selecting a known material on the basis of its suitability for the intended use is within the level of ordinary skill in the art, *In re Leshin*, 125 USPQ 416 (CCPA 1960).

***Allowable Subject Matter***

9. Claim 11 is allowable over the prior art of record.

***Response to Arguments***

10. Applicant's arguments filed 12 December 2006 have been fully considered but they are not persuasive.

The applicant challenges the examiner's statement of official notice that CoFeV with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent is a notoriously old and well known pinned layer material in that art in stating that "Applicant sincerely disagrees, and is unaware of any prior use of CoFeV in a pinned layer structure." Applicant's attention is directed to Gill (US 2002/0135952), for instance, which teaches that CoFeV with an atomic percent of Fe ranging from 20 to 60 percent and an atomic percent of V ranging from 2 to 10 percent is a notoriously old and well known pinned layer material in that art (paragraph [0015] on page 3, for instance, i.e., "Co<sub>49</sub>Fe<sub>49</sub>V<sub>2</sub>", for instance). The inclusion of Gill (US 2002/0135952) in the rejection in paragraph 8, *supra*, does not constitute a new

Art Unit: 2627

grounds of rejection as it is merely included to show support for that which the examiner has already taken official notice of being notoriously old and well known in the art.

***Conclusion***

11. Applicant's amendment, which only incorporated the limitations of independent claim 1 into each of claims 17 and 18 without also including the limitations of intermediate base claim 11, necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Tuesday-Friday 9:00 AM - 7:30 PM.

Art Unit: 2627

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Craig A. Renner  
Primary Examiner  
Art Unit 2627

CAR